

INTERNATIONAL RECTIFIER



# 1N3879, 1N3889, 6FL, 12FL, 16FL SERIES

6A, 12A and 16A Fast  
Recovery Rectifiers

## Major Ratings and Characteristics

	1N3879 -1N3883	1N3889 -1N3893	6FL...	12FL...	16FL...	Unit
I(F(AV)) <sup>†</sup>	6*	12*	6	12	16	A
IFSM	50Hz 60Hz	72 75*	145	110 150	145 190	A
I <sub>z</sub> <sub>t</sub>	50Hz 60Hz	26 23	103	60 55	103 94	A <sup>2</sup> s
$\sqrt{\frac{I_z}{t}}$	363	1452	855	1452	2290	A <sup>2</sup> /s
T <sub>r</sub> range	see table				ns	
V <sub>RRM</sub> range	50 - 400*		50 - 1000		V	
T <sub>j</sub> range	-65 to 150				°C	

\* JEDEC registered values.

† At max. T<sub>C</sub> = 100°C.

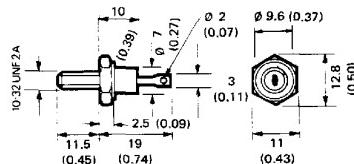
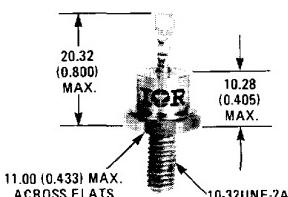
## Description

This range of fast recovery diodes is designed for applications in DC power supplies, inverters, converters, choppers, ultrasonic systems and for use as free wheel diodes.

## Features

- Short reverse recovery time
- Low stored charge
- Wide current range
- Excellent surge capabilities
- Standard JEDEC types
- Stud cathode and stud anode versions
- Types up to 1000V V<sub>RRM</sub>
- Fully characterised reverse recovery conditions

## CASE STYLE AND DIMENSIONS



Conforms to JEDEC : DO-203AA (DO-4)

IEC 191-2 : A3U

BS 3934 : SO-10A

DIN 41885 : 101 C 2

All dimensions in millimetres (inches)

## REVERSE VOLTAGE RATINGS

Part Number	① ②	VR <sub>RM</sub> — Max. Repetitive Peak Reverse Voltage	VR <sub>RM</sub> — Max. Non-Repetitive Peak Reverse Voltage $t_p \leq 5$ ms	I <sub>R</sub> — Max. Reverse Current At Rated VR		
				T <sub>J</sub> = 25°C	T <sub>J</sub> = 100°C	T <sub>J</sub> = 150°C
1N3879		50	75	0.015*	1.0*	3.0*
1N3880		100	150	0.015*	1.0*	3.0*
1N3881		200	250	0.015*	1.0*	3.0*
1N3882		300	350	0.015*	1.0*	3.0*
1N3883		400	450	0.015*	1.0*	3.0*
1N3888		50	75	0.025*	3.0*	5.0*
1N3889		100	150	0.025*	3.0*	5.0*
1N3891		200	250	0.025*	3.0*	5.0*
1N3892		300	350	0.025*	3.0*	5.0*
1N3893		400	450	0.025*	3.0*	5.0*
6FL5S02	6FL5S05	6FL5S10	50	75	0.050	—
6FL10S02	6FL10S05	6FL10S10	100	150	0.050	—
6FL20S02	6FL20S05	6FL20S10	200	275	0.050	—
6FL40S02	6FL40S05	6FL40S10	400	500	0.050	—
6FL60S02	6FL60S05	6FL60S10	600	725	0.050	—
—	6FL80S05	6FL80S10	800	950	0.050	—
—	6FL100S05	6FL100S10	1000	1250	0.050	—
12FL5S02	12FL5S05	12FL5S10	50	75	0.050	—
12FL10S02	12FL10S05	12FL10S10	100	150	0.050	—
12FL20S02	12FL20S05	12FL20S10	200	275	0.050	—
12FL40S02	12FL40S05	12FL40S10	400	500	0.050	—
12FL60S02	12FL60S05	12FL60S10	600	725	0.050	—
—	12FL80S05	12FL80S10	800	950	0.050	—
—	12FL100S05	12FL100S10	1000	1250	0.050	—
16FL5S02	16FL5S05	16FL5S10	50	75	0.050	—
16FL10S02	16FL10S05	16FL10S10	100	150	0.050	—
16FL20S02	16FL20S05	16FL20S10	200	275	0.050	—
16FL40S02	16FL40S05	16FL40S10	400	500	0.050	—
16FL60S02	16FL60S05	16FL60S10	600	725	0.050	—
—	16FL80S05	16FL80S10	800	950	0.050	—
—	16FL100S05	16FL100S10	1000	1250	0.050	—

## REVERSE RECOVERY CHARACTERISTICS

	1N3879 — 1N3883	6FL...			12FL...			16FL...			Unit	Conditions	
		S02	S05	S10	S02	S05	S10	S02	S05	S10			
t <sub>r</sub>	Max. reverse recovery time	150	150	110	285	490	100	250	430	90	225	390	ns
		300*	300*	200	500	1000	200	500	1000	200	500	1000	t <sub>J</sub> = 25°C, I <sub>F</sub> = 1A to VR = 30V dI/F/dt = 100 A/μs
I <sub>RM</sub> (REC)	Max. peak recovery current	4*	5*	—	—	—	—	—	—	—	—	—	I <sub>FM</sub> = π x rated I <sub>F</sub> (AV)
		400	350	230	1700	5000	200	1300	3800	150	1100	3000	nC
ORR	Max. reverse recovered charge	—	—	—	—	—	—	—	—	—	—	—	t <sub>J</sub> = 25°C, I <sub>F</sub> = 1A to VR = 30V dI/F/dt = 25 A/μs
		400	400	200	1200	5000	200	1200	5000	200	1200	5000	nC

## ELECTRICAL SPECIFICATIONS

	1N3879 — 1N3883	6FL...	1N3889 — 1N3893	12FL...	16FL...	Unit	Conditions
<b>FORWARD CONDUCTION</b>							
I(F(AV))	Max. average forward current	6*	6	12*	16	A	180° conduction, half sine wave, T <sub>C</sub> = 100°C
I(F(RMS))	Max. r.m.s. forward current	9.5	9.5	19	25	A	
I(FSM)	Max. peak one-cycle non-repetitive forward current	72	110	145	180	A	t = 10 ms t = 8.3 ms With rated VR <sub>RM</sub>
	75*	115	150*	190			t = 8.3 ms Sinusoidal half wave, initial T <sub>J</sub> = 150°C
	85	130	170	215			V <sub>RRM</sub> = 0
	90	135	180	225			
I <sup>2</sup> t	Max. I <sup>2</sup> t for fusing	26	60	103	180		t = 10 ms With rated VR <sub>RM</sub>
		23	55	94	150	A <sup>2</sup> s	t = 8.3 ms
	Max. I <sup>2</sup> t for individual device fusing	36	88	145	230		t = 10 ms V <sub>RRM</sub> = 0
		33	78	130	210		t = 8.3 ms
I <sup>2</sup> √t	Max. I <sup>2</sup> √t for individual device fusing	363	856	1452	2290	I <sup>2</sup> √t	t = 0.1 to 10 ms
V <sub>FM</sub>	Max. peak forward voltage	1.4*	1.4	1.4*	1.4	V	t <sub>J</sub> = 25°C, I <sub>F</sub> = rated I <sub>F</sub> (AV) (D.C.)
		1.5*	1.5	1.5*	1.5	V	T <sub>C</sub> = 100°C, I <sub>FM</sub> = π x rated I <sub>F</sub> (AV)

\*JEDEC registered value

\*\*Suffix "SO2" may be omitted, i.e., 12FL10 implies 12FL10S02,

12FL60 implies 12FL60S02.

①Types listed are cathode to case; for anode-to-case include "R" in code, i.e., 1N3879R, 6FLR20S10, 16FLR40S02.

①I<sub>R</sub>(AV) @ rated I<sub>F</sub>(AV) and V<sub>RRM</sub>, and T<sub>C</sub> = 100°C.②I<sub>R</sub> @ rated V<sub>RRM</sub> and T<sub>J</sub> = 150°C.③I<sup>2</sup>t for time t<sub>x</sub> = I<sup>2</sup> √ t \* √ x

④When these devices are ordered without a suffix, e.g., 40HFL, the order will be filled with devices that meet the SO2 specification.



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## Thermal and mechanical specifications

	1N3879 -1N3883 6FL...	1N3889 -1N3893 12FL...	16FL...	Units	Conditions
T <sub>j</sub>	Junction operating temperature range	-65 to 150		°C	
T <sub>stg</sub>	Storage temperature range	-65 to 175		°C	
R <sub>thJC</sub>	Maximum internal thermal resistance, junction to case	2.5	2.0	1.6	deg C/W DC operation
R <sub>thCS</sub>	Maximum thermal resistance, case to heatsink		0.5	deg C/W	Mounting surface flat, smooth and greased.
T	Mounting torque to nut ±10%	10.5		lbf.in	Lubricated threads
		0.12		kgf.m	(Non-lubricated threads)
	to device	1.2		Nm	
		11.5 (13.5)		lbf.in	
0.13 (0.155)			kgf.m		
wt	Approximate weight	1.3 (1.35)		Nm	
		0.25		oz	
	Case style	DO-203AA (DO-4)			JEDEC

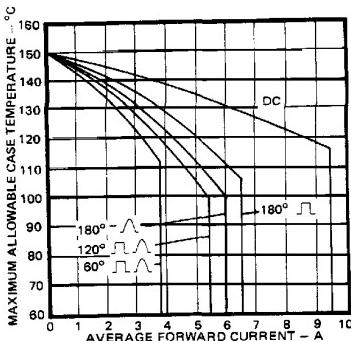


Fig. 1 — Average Forward Current Vs. Maximum Allowable Case Temperature, 1N3879 and 6FL Series

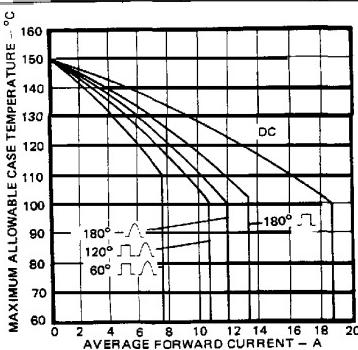


Fig. 2 — Average Forward Current Vs. Maximum Allowable Case Temperature, 1N3889 and 12FL Series

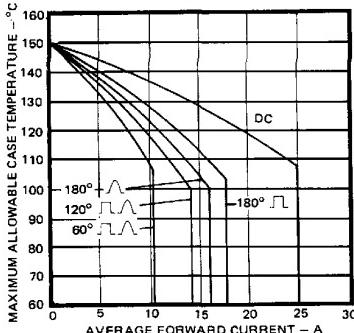


Fig. 3 — Average Forward Current Vs. Maximum Allowable Case Temperature, 16FL Series

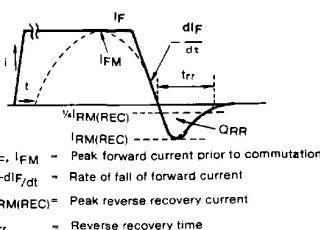


Fig. 4 — Reverse Recovery Time Test Waveform

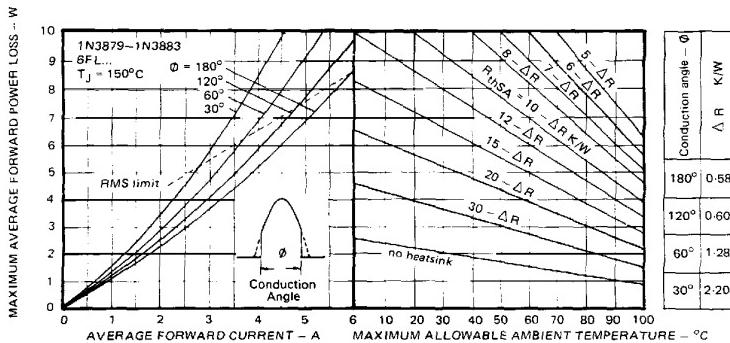


Fig. 5 – Current Rating Nomogram (Sinusoidal Waveforms), 1N3879 and 6FL Series

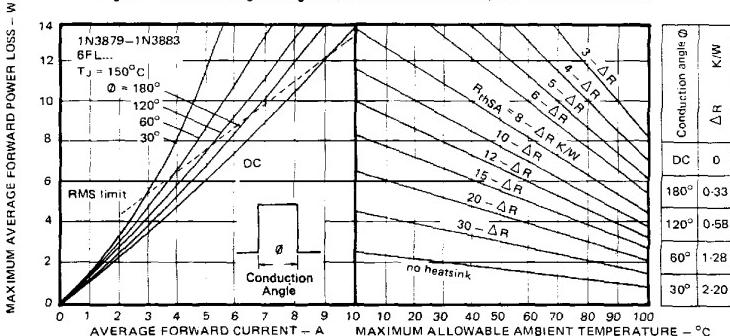


Fig. 6 – Current Rating Nomogram (Rectangular Waveforms), 1N3879 and 6FL Series

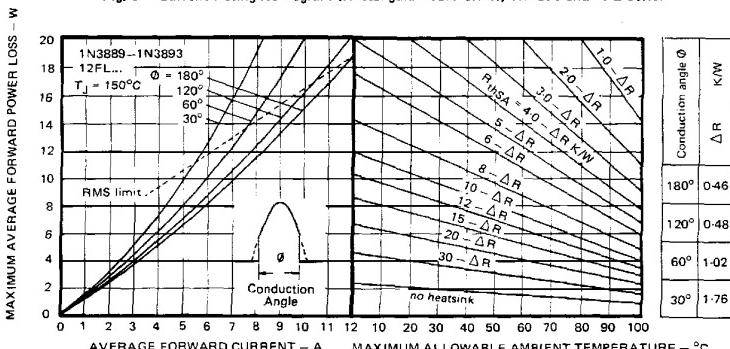


Fig. 7 – Current Rating Nomogram (Sinusoidal Waveforms), 1N3889 and 12FL Series

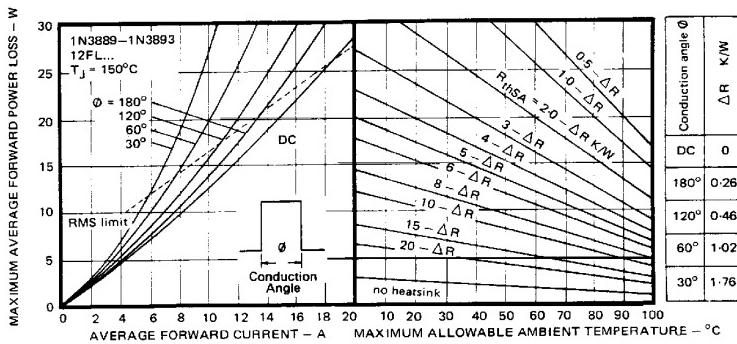


Fig. 8 — Current Rating Nomogram (Rectangular Waveforms), 1N3889 and 12FL Series

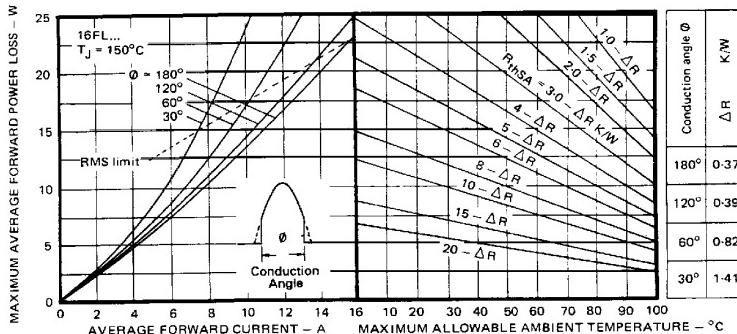


Fig. 9 — Current Rating Nomogram (Sinusoidal Waveforms), 16FL Series

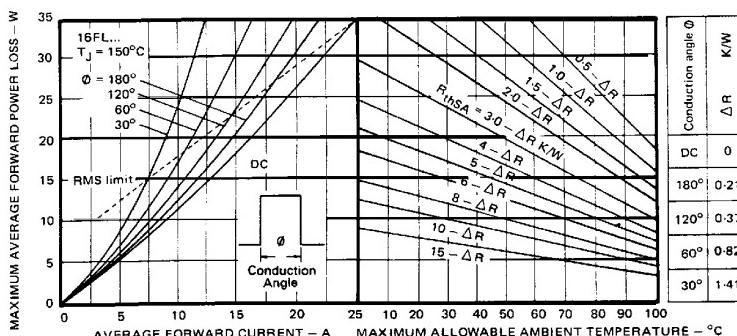


Fig. 10 — Current Rating Nomogram (Rectangular Waveforms), 16FL Series

**1N3879, 1N3889, 6FL, 12FL, 16FL Series**

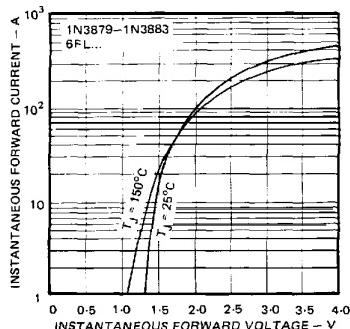


Fig. 11 — Maximum Forward Voltage Vs. Forward Current, 1N3879 and 6FL Series

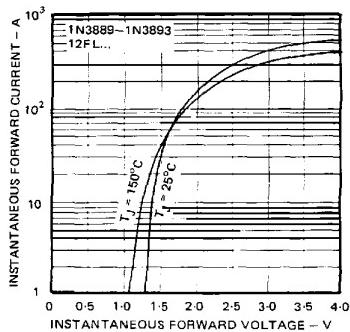


Fig. 13 — Maximum Forward Voltage Vs. Forward Current, 1N3889 and 12FL Series

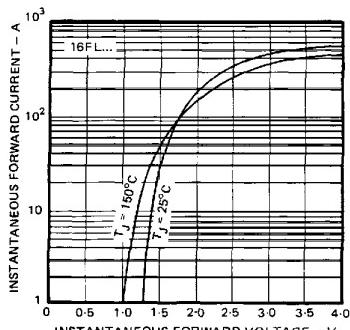


Fig. 15 — Maximum Forward Voltage Vs. Forward Current, 16FL Series

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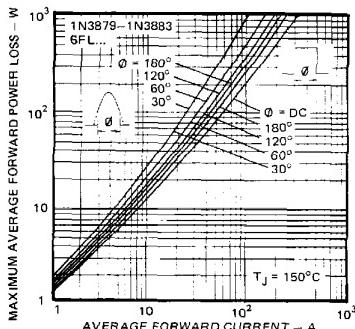


Fig. 12 — Maximum High Level Forward Power Loss Vs. Average Forward Current, 1N3879 and 6FL Series

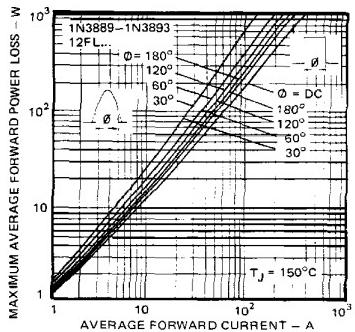


Fig. 14 — Maximum High Level Forward Power Loss Vs. Average Forward Current, 1N3889 and 12FL Series

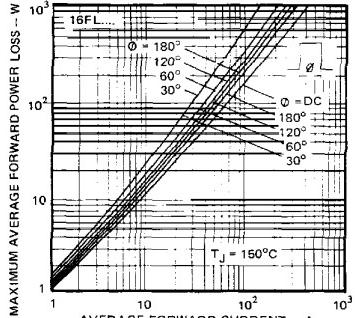


Fig. 16 — Maximum High Level Forward Power Loss Vs. Average Forward Current, 16FL Series



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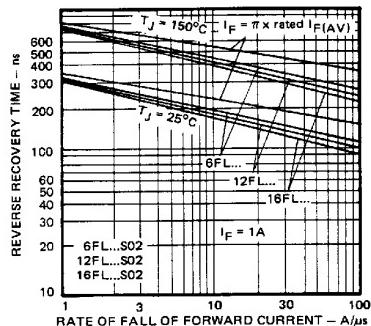


Fig. 17A — Maximum Reverse Recovery Time Vs.  
Rate of Fall of Forward Current, All Series \_S02

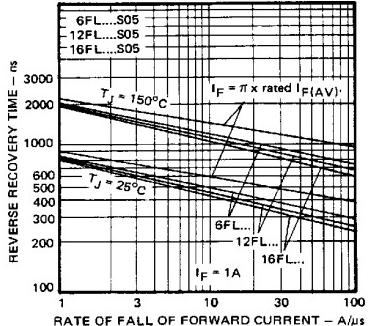


Fig. 18A — Maximum Reverse Recovery Time Vs.  
Rate of Fall of Forward Current, All Series \_S05

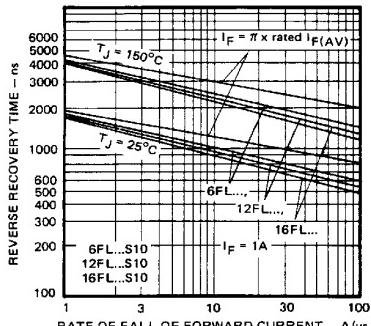


Fig. 19A — Maximum Reverse Recovery Time Vs.  
Rate of Fall of Forward Current, All Series \_S10

**1N3879, 1N3889, 6FL, 12FL, 16FL Series**

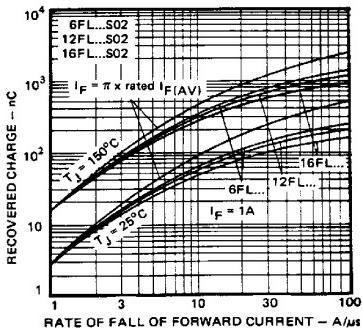


Fig. 17B — Maximum Recovered Charge Vs. Rate of  
Fall of Forward Current, All Series \_S02

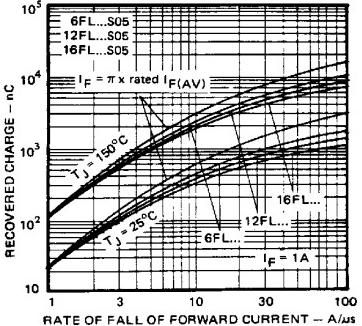


Fig. 18B — Maximum Recovered Charge Vs. Rate of  
Fall of Forward Current, All Series \_S05

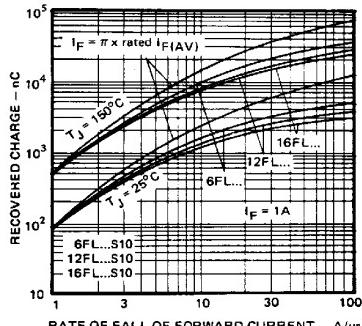


Fig. 19B — Maximum Recovered Charge Vs. Rate of  
Fall of Forward Current, All Series \_S10

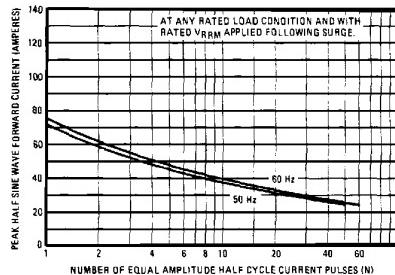


Fig. 20 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 1N3879 Series

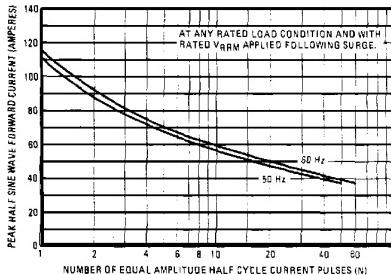


Fig. 21 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 6FL Series

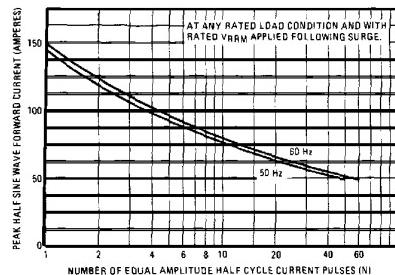


Fig. 22 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 1N3889 and 12FL Series

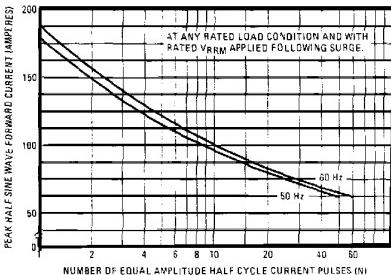


Fig. 23 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 16FL Series

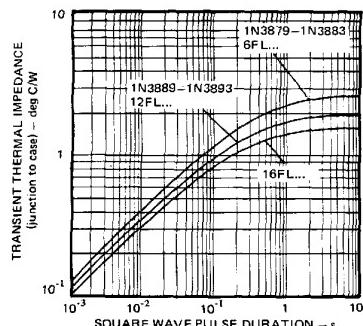


Fig. 24 — Maximum Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration, All Series.